## INVESTMENT

**GEF USD 38,569**

**Co-financing from the City of Tirana, the Institute for Environmental Policy and others USD 21,516**

**Total fiancing USD 60,085**

## PROJECT DURATION

November 2009-August 2010

## NUTRIENT CHALLENGES

- Heavy nutrient pollution in the Tirana River from sewage and runoff from the city of Tirana dumped directly into the river has eliminated almost all the biodiversity of the river (invertebrates, fish and other aquatic life).
- Nutrient pollution from unpermitted houses built on the floodplain and on filled land that alters the river's course.
- Specific Pollution Sensitivity Index (IPS) of 2, (good is 13 ≤IPS < 17 corresponds to poor or bad water quality; nitrites are many times higher than EU limits; suspended solids in waters for Tirana river exceeded the value of 25 mg/L of the 2006/44/EC Fish Directive.
- Significant solid waste

## EARLY NUTRIENT BMP "WINS

- Low cost option to reduce sediment and nutrient pollution from urban wastewater through a constructed wetland

# ALBANIA

# Constructed Wetland for Nutrient Reductions in the Waters of the Tirana River

## Project Summary and Scope

The objective of this project is to reduce nutrient pollution in the Tirana River by developing and evaluating the "first ever" constructed wetland system in Albania along the banks of the river.

- **Component 1:** Evaluation of the system – In order to determine the effectiveness of the wetland system, water was sampled and analysed prior to and subsequent to construction and implementation to estimate water quality impacts in the first year.
- **Component 2:** Reduction of nutrient pollution – The project involved creating a three-tiered wetland system to remove nitrogen, phosphorus and sediment from sewage and urban runoff.
- **Component 3:** Outreach into the community – The primary outreach efforts were to officials from the city of Tirana.

## Benefits and Best Practices

- The constructed wetland was established in an urban setting including a sedimentation basin to hold suspended solids, a second basin consisting of shallow layer of surface water, flowing over mineral (sandy) or organic (peat) soils and vegetation (marsh plants) to remove nutrients and a larger third basin comprised of trees and larger vegetation for polishing effluent and creating wildlife habitat (frogs have started to reside in this area).
- A buffer zone was created with three rows of vegetation and shallow canals along the bank planted with aquatic vegetation. This created some mini-wetlands that will stop the sediments and runoff from directly entering the constructed wetland.
- Water sampling and analysis determined the level of pollution and is important as part of a monitoring program, to identify any trends and impacts as a result of the project.

## Other Key Successes

- The banks of the river in the area had been used for dumping of garbage and solid waste. The project began removal of garbage and solid waste in the area and raised awareness of the issue among stakeholders.
- The minister of the environment of Albania agreed to host a ministerial-level meeting during the first quarter of 2011 to discuss how to foster cooperation to address nutrient pollution in the region.
- Outreach to the community is important in building awareness of the capacity and capability of constructed wetlands to address nutrient pollution.

## Lessons Learned

- Land ownership is a critical consideration to ensuring the outcomes, security and sustainability of the project. While the Municipality of Tirana decided to locate the project on a floodplain, illegal houses were being built next to it.
- The most important factors in the performance are the residence time of the water in the wetland and contact of the water with vegetation and wetland substrate so there is ample opportunity for treatment. Despite the limited time period for vegetation growth, water exiting the wetland was notably clearer than what entered.
- Constructed wetlands are used very effectively to reduce nutrients and suspended solids from municipal wastewater but usually only after at least primary treatment and disinfection. The wetland has limited chemical or biological ability to kill pathogens in wastewater.

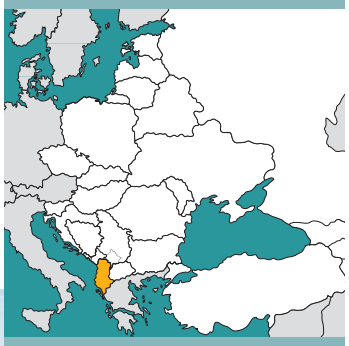
## Key BMP Indicators

- Rate of influent flow
- Residence time in the wetland
- Levels of total phosphorous, $PO_4$, total nitrogen, ammonium, nitrites, nitrates, suspended solids, and fecal and total coliform in the effluent and river water

## Further Information

Edvin Pacara, Institute for Environmental Policy: **edvin.pacara@iep-al.org**.

Project website: **http://www.iep-al.org/index.php?option=com_content&view=article&id=84%3Aconstructed-wetland-for-nutrient-reductions-in-the-waters-of-tirana-river&catid=40%3Awater-management&Itemid=88&lang**



**About the Living Water Exchange**

The Living Water Exchange, a GEF/UNDP project promoting nutrient reduction best practices in Central and Eastern Europe, will share information and accelerate the replication of the most appropriate nutrient reduction practices developed from GEF and other investments in the region.

For more information, please visit **http://nutrient-bestpractices.iwlearn.org/** or email Chuck Chaitovitz **chuck@getf.org**

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